Rate-disabled versus accuracy-disabled subtypes of dyslexia: A longitudinal study from kindergarten to second grade

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Research topic: The present study addresses the issue of heterogeneity among dyslexics. Specifically, I aim to validate a novel dyslexia subtyping scheme developed by Shany and colleagues based on the distinction between (word) reading rate and reading accuracy. Shany reported a double dissociation between rate and accuracy among samples of young (4th grade) dyslexics and adult dyslexics. Selectively rate-disabled dyslexics had RAN deficits, whereas selectively accuracy-disabled dyslexics had multiple linguistic deficits, most notably in phonological awareness (PA) and morphological awareness (MA). The present investigation will examine this issue at the foundational stages of reading in the context of the Safra longitudinal study from kindergarten to the end of 2nd grade. In addition, the study aims to determine whether specific accuracy-disabled readers represent a mild form of developmental language disorder (DLD).

Specific research questions are:

1) Before children begin to learn to read (1st grade in Israel), is there a double dissociation between RAN and PA/MA deficits? That is, are there kindergarteners who have only RAN deficits but normal PA and MA, as well as kindergarteners with the reverse pattern – normal RAN but deficient PA/MA deficits?
2) How stable are these profiles over the early years of schooling?
3) Do these children later have selective problems with reading rate and reading accuracy?
4) Is the specific accuracy-disabled subtype a mild form of DLD?

Why is my study unique? The question of heterogeneity and subtyping within the LD population is currently at the forefront of contemporary LD research (see, e.g., Snowling & Hulme, 2020). This will be the first longitudinal study of dyslexia *subtyping* to be undertaken in Hebrew – a non-European language written in a non-alphabetic script. Furthermore, if validated, Shany's accuracy/rate subtyping framework potentially has universal application across languages and orthographies. Furthermore, this study and its Arabic counterpart (see Maysa Jabbour-Danial) will permit a direct cross-linguistic comparison of the Hebrew and Arabic findings.

Planned analyses: I am currently analyzing the data collected in kindergarten and 1st grade, with the aim of replicating the double dissociation reported by Shany and colleagues on RAN vs. PA+MA deficits. Namely, are there children with selective RAN deficits (but intact PA and MA skills) as well as children with selectively impaired PA and MA skills but intact RAN, who can be identified *before* formal reading instruction (1st grade in Israel). Following up these children into 2nd grade, I predict that the RAN-only disabled kindergarteners will become slow but accurate readers, whereas the PA+MA-only kindergarten group will have selective difficulties with reading accuracy. This will be achieved using the cross-classification of selective kindergarten RAN/PA+MA profiles and 2nd grade reading accuracy-only and reading rate-only subgroups (contingency matrices). Exploiting the comprehensive language battery available from the Safra longitudinal study, I will also determine whether the PA+MA subgroup constitute a mild form of developmental language disorder (DLD).

Why is my research important for education and/or clinical practice? Holistic models of reading (e.g., *top-down, bottom-up, interactive*) have been superseded by multi-componential models in which reading is seen as the orchestration of several distinct skills and varieties of knowledge, each of which can be broken down in a selective fashion. This finer-grained resolution of contemporary models calls for a closer analysis of reading difficulties and more differentiated/tailored instruction. Shany's accuracy-rate typology has direct implications for the way we assess and teach children with *different* types of reading problems, as well as for early intervention for at-risk children and prevention of later reading disability. The beauty of Shany's subtyping scheme is its potential applicability to any language and orthography.